Human Landing Sites Study (HLS2) Workshop
Lessons Learned and Future Needs
Statement

Oct. 20, 2015

Introduction

Dear Colleague,

As a registered attendee of the “First Landing Site/Exploration Zone Workshop for Human Missions to the Surface of Mars” to be held October 27-30, 2015, you are invited to contribute to the preparation of a “workshop statement” designed to capture lessons learned from the workshop as well suggestions for future needs that will ultimately lead to selection of a human landing site on Mars.

This “workshop statement” will be discussed on the last day of the workshop. In addition to participation in the group discussion, you will have an opportunity to submit any additional related thoughts or comments for two weeks following the close of the workshop itself.

To aid in the formulation of this document, we have attached questions for your review and consideration in advance of the workshop. We look forward to hearing your ideas.

Thank you in advance for your participation,

Human Landing Sites Study (HLS2) Steering Committee

Objective and Uses for a "Workshop Statement"

- Objective: develop a document capturing the "sense of the participants" at the close of the First Landing Site/Exploration Zone Workshop for Human Missions to the Surface of Mars and the Human Landing Sites Study (HLS2) Steering Committee's observations or findings based on these and other inputs
- Uses for this document:
  - Guidance for data gathering requests to be submitted to flight projects (i.e., MRO, MSL, etc.)
  - Guidance for developing an Announcement of Opportunity (AO) for more detailed Exploration Zone (EZ) analyses
  - Guidance for designating several EZs as "reference EZs"
  - Guidance for more detailed Mars surface human mission analyses by the Human Spaceflight Architecture Team (HAT) as inputs into NASA's Evolvable Mars Campaign (EMC)
  - Guidance for the HLS2 Steering Committee to prepare for follow-on workshops
  - Material to be included in HLS2 Steering Committee report(s) to HEOMD and SMD management
- Working title: "Workshop Statement on Lessons Learned and Future Needs to Support Selection of Human Landing Sites on Mars" (shortened to "Workshop Statement" for the remainder of this document)

Workshop Statement
Draft Outline and Questions (1 of 3)

- EZ Concept "existence proof"
  - What is the collective opinion regarding the viability/value of the EZ concept in describing and assessing human exploration on Mars?
  - What changes should be made to the EZ criteria distributed prior to the workshop (including rationale for the change)?
  - Are there any compelling reasons to go to sites above 40 degrees latitude? Above 30 degrees latitude?
- Data Collection
  - Potential targets for the Mars Reconnaissance Orbiter (MRO) – assembled from EZ presentations (maybe prioritized but not filtered) plus group discussion
  - Ground truth – identify needs or opportunities for surface assets to collect data that can be compared to orbital data that will assist in selecting human landing site(s)
  - New data types needed (i.e., never collected before) that will assist in selecting human landing site(s) – assembled from EZ presentations plus group discussion
- Data Analyses
  - Analyses needed to improve understanding of proposed EZs – assembled from EZ presentations and used as input for proposed EZ Analysis AO
  - Non-site specific analyses of existing data (or new data as it arrives) – e.g., additional and/or refined analyses of data associated with potential regional or global distribution and concentration of resource related material

Workshop Final Statement
Draft Outline and Questions (2 of 3)

- EZ selection process (i.e., this workshop, including the steps preceding it and proposed steps after, such as follow-on workshops) improvement recommendations
  - What should be kept more or less intact, what should be changed, what should be added, what should be removed, what was missed?
- Reference EZs
  - Discussion of which EZ(s) (if any) would make good "stressing cases" for assessment purposes
    - Features that envelop all of the sites (e.g., max latitude, max altitude, etc.)
    - Specific locations that can be used to test concepts of operation and/or hardware/technology options . For example:
      - A high latitude site with shallow ice potential – how would the ISRU community deal with it?
      - A hydrated mineral site – how would ISRU community deal with it?
      - Recurring Slope Lineae (RSL) site – how would the science community deal with it given planetary protection guidelines/constraints?)
- Consolidated summary of Site Selection Criteria "Rubric"
  - Assembled from all of the presentations (the "rubric" was one of the requested items in the presentation template)
- What should be the focus of the next workshop and how much time should be allowed until this workshop is held?

Workshop Final Statement
Draft Outline and Questions (3 of 3)

- Other
  - Is an ISRU/Civil Engineering Analysis Group equivalent of MEPAG/LEAG/SBAG needed?
    - Collect rationale during group discussion
  - What other recommendations do Workshop participants have to improve / accelerate our ability to pick a human landing site / Exploration Zone?
  - Anything else that the group wants to discuss that is not covered by the previous items